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"From the physical standpoint the question is: whether the postulates *as interpreted* are correct expressions of physical facts, or in some respect only approximations?

"If the postulates are not all correct expressions of the facts, then which of them require emendation and what emendation do they require?

"As regards the pure mathematical aspect of the theory: this of course remains unaffected by the physical interpretation of the postulates, and those who are interested only in pure mathematics may find that the method employed has certain advantages as a study of the foundations of geometry.

"In particular it may be noticed that by this method we get a system of geometry in which 'congruence' appears, not as something extraneous grafted on to an otherwise complete system, but as an intrinsic part of the system itself.

"I had intended making further developments of this theory, but the outbreak of the war caused an interruption of my work.

"In the meantime Einstein produced his 'generalized relativity' theory and the reader will doubtless wish to know how this work bears upon it.

"So far as I can at present judge, the situation is this: once coördinates have been introduced, the theory here developed gives rise to the same analysis as Einstein's so-called 'restricted relativity' and this latter cannot be regarded as satisfactory apart from my work, or some equivalent.

"Einstein's more recent work is extremely analytical in character.

"The *before* and *after* relations have not been employed at all in its foundation, although it is evident that, if these relations are a sufficient basis for the simple theory, they must play an equally important part in any generalization. Moreover these relations most certainly have a physical significance whatever theory be the correct one.

"A generalization of my own work is evidently possible and, to a certain extent, I can see a method of carrying this out, although I have not as yet worked out the details. (See Appendix.)

"In the meantime it seemed desirable to write some sort of introduction to my *Theory of Time and Space* which, while not going into the proofs of theorems, would yet convey to a larger circle of readers the main results arrived at in that work."

Contents—Preliminary considerations, 1–16; Conical order, 16–45; Normality of general lines having a common element, 46–55; Theory of congruences, 56–71; Introduction of coördinates, 72–75; Interpretation of results, 76–78; Appendix, 78–80.

Introduction to the Theory of Fourier's Series and Integrals. By H. S. Carslaw. Second edition, completely revised. London, Macmillan, 1921. 8vo. 11 + 323 pp. Price 30 shillings.

Preface: "This book forms the first volume of the new edition of my book on *Fourier's Series and Integrals and the Mathematical Theory of the Conduction of Heat,* published in 1906, and now for some time out of print. Since 1906 so much advance has been made in the Theory of Fourier's Series and Integrals, as well as in the mathematical discussion of Heat Conduction, that it has seemed advisable to write a completely new work, and to issue the same in two volumes. The first volume, which now appears, is concerned with the Theory of Infinite Series and Integrals, with special reference to Fourier's Series and Integrals. The second volume will be devoted to the Mathematical Theory of the Conduction of Heat.

"No one can properly understand Fourier's Series and Integrals without a knowledge of what is involved in the convergence of infinite series and integrals. With these questions is bound up the development of the idea of a limit and a function, and both are founded upon the modern theory of real numbers. The first three chapters deal with these matters. In Chapter IV the Definite Integral is treated from Riemann's point of view, and special attention is given to the question of the convergence of infinite integrals. The theory of series whose terms are functions of a single variable, and the theory of integrals which contain an arbitrary parameter are discussed in Chapters V and VI. It will be seen that the two theories are closely related, and can be developed on similar lines.

"The treatment of Fourier's Series in Chapter VII depends on Dirichlet's Integrals. There and elsewhere throughout the book, the Second Theorem of Mean Value will be found an essential part of the argument. In the same chapter the work of Poisson is adapted to modern standard, and a prominent place is given to Fejér's work, both in the proof of the fundamental theorem and in the discussion of the nature of the convergence of Fourier's Series. Chapter IX is devoted to Gibbs's Phenomenon, and the last chapter to Fourier's Integrals. In this chapter the works

of Pringsheim, who has greatly extended the class of functions to which Fourier's Integral Theorem applies, has been used.

"Two appendices are added. The first deals with 'Practical Harmonic Analysis and Periodogram Analysis.' In the second a bibliography of the subject is given.

"The functions treated in this book are 'ordinary' functions. An interval (a, b) for which $f(x)$ is defined can be broken up into a finite number of open partial intervals, in each of which the function is monotonic. If infinities occur in the range, they are isolated and finite in number. Such functions will satisfy most of the demands of the Applied Mathematician.

"The modern theory of integration, associated chiefly with the name of Lebesgue, has introduced into the Theory of Fourier's Series and Integrals functions of a far more complicated nature. Various writers, notably W. H. Young, are engaged in building up a theory of these and allied series much more advanced than anything treated in this book. These developments are in the meantime chiefly interesting to the Pure Mathematician specialising in the Theory of Functions of a Real Variable. My purpose has been to remove some of the difficulties of the Applied Mathematician."

Contents—

Each chapter concludes with bibliographical "References." The names of the following Americans occur in the work: BÔCHER, BYERLY, FORD, GRONWALL, JACKSON, C. N. MOORE, and VAN VLECK.

Plane and Solid Analytic Geometry. By W. F. OSGOOD and W. C. GRAUSTEIN. New York, The Macmillan Company, 1921. 12mo. 17 + 614 pp. Price $3.75.

Preface: "The object of an elementary college course in Analytic Geometry is twofold: it is to acquaint the student with new and interesting and important geometrical material, and to provide him with powerful tools for the study, not only of geometry and pure mathematics, but in no less measure of physics in the broadest sense of the term, including engineering.

"To attain this object, the geometrical material should be presented in the simplest and most concrete form, with emphasis on the geometrical content, and illustrated, whenever possible, by its relation to physics. This principle has been observed throughout the book. Thus, in treating the ellipse, the methods actually used in the drafting room for drawing an ellipse from the data commonly met in descriptive geometry are given a leading place. The theorem that the tangent makes equal angles with the focal radii is proved mechanically: a rope which passes through a pulley has its ends tied at the foci and is drawn taut by a line fastened to the pulley. Moreover, the meaning of foci in optics and acoustics is clearly set forth. Again, there is a chapter on the deformations of an elastic plane under stress, with indications as to the three-dimensional case (pure strain, etc.).

"The methods of analytic geometry, even in their simplest forms, make severe demands on the student's ability to comprehend the reasoning of higher mathematics. Consequently, in presenting them for the first time, purely algebraic difficulties, such as are caused by literal coefficients and long formal computations, should be avoided. The authors have followed this principle consistently, beginning each new subject of the early chapters with the discussion of a simple special, but typical, case, and giving immediately at the close of the paragraph simple examples of the same sort. They have not, however, stopped here, but through carefully graded problems, both of geometric and of analytic character, have led the student to the more difficult applications of the methods, and collections of examples at the close of the chapters contain such as put to the test the initiative and originality of the best students.

"As a result of this plan the presentation is extraordinarily elastic. It is possible to make the treatment of any given topic brief without rendering the treatment of later topics unintelligible, and thus the instructor can work out a course of any desired extent. For example, one freshman